Understanding Social Computing: Accelerating Social Participation

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Interdisciplinary research community
- Computer Science & Info Studies
- Psych, Socio, Poli Sci & MITH

(www.cs.umd.edu/hcil)
Design Issues

- Input devices & strategies
  - Keyboards, pointing devices, voice
  - Direct manipulation
  - Menus, forms, commands
- Output devices & formats
  - Screens, windows, color, sound
  - Text, tables, graphics
  - Instructions, messages, help
- Collaboration & Social Media
- Help, tutorials, training
- Search & Visualization
Visible Human Explorer (NLM)

- Doctors
- Surgeons
- Researchers
- Students
NSF Digital Government Initiative

- Find what you need
- Understand what you Find

www.ils.unc.edu/govstat/

Census, NCHS, BLS, EIA, NASS, SSA

FEDSTATS

Spotfire
100M-pixels & more

Large displays for single users

infovis.cs.vt.edu/gigapixel
Treemap: Smartmoney MarketMap

Market falls steeply Feb 27, 2007, with one exception
Market mixed, February 8, 2008

Energy & Technology up, Financial & Health Care down

Treemap: Supply Chain
Treemap: NY Times – Car&Truck Sales

International Children’s Digital Library

www.childrenslibrary.org
Collaborative Technologies & Systems:
Call For Papers

Collaborative
Systems
Management

Program

University
Integrate Internet and mobile technologies:

- Residents report information
- Professionals disseminate instructions
- Resident-to-Resident assistance

Professionals in control while working with empowered residents

Shneiderman & Preece, Science (Feb. 16, 2007)

www.cs.umd.edu/hcil/911gov
Potential Advantages of CRGs

- Interoperability & scalability
- Survivability thru multiple communication channels
- Universal usability
- Trust based on social networks established before emergency
- Highly localized information

Philip Fei Wu (fwu@umd.edu), Jenny Preece, Yan Qu
Jen Golbeck, Ken Fleischmann, Paul T. Jaeger

How to motivate participation?

Disaster-related
- Reporting
- Response
- Recovery

What has been tried?
Reporting: Earthquakes & Storms

earthquake.usgs.gov/eqcenter/dyfi
weather.kimt.com

Reporting: Abducted Children

www.ncmec.org
www.missingkids.com
www.amberalert.gov
Reporting: Wildfires
Response: Wildfires

Twitter: @natteritter

- #Waondeggafire Harris fire now 50 percent contained 08:21 AM October 27, 2007 from web
- #Waondeggafire Wash Creek fire now 60 percent contained 08:21 AM October 27, 2007 from web
- #Waondeggafire Rice Canyon fire now 80 percent contained 08:21 AM October 27, 2007 from web
- #Sprague That's really cool, thanks! 08:20 AM October 27, 2007 from web
- #Waondeggafire All Del Dios residents may return to their homes, county officials have announced 08:19 AM October 27, 2007 from web
- #Waondeggafire 1,600 people are still without power, but that service has been restored for 70 percent of those who lost it 08:15 PM October 26, 2007 from web
- #Waondeggafire Residents who are approached by unlicensed contractors should report it to the District Attorney’s office at 1-800-215-7072 08:15 PM October 26, 2007 from web
- #Waondeggafire The Witch Creek fire is burning its way toward the rural town of Julian. 03:55 PM October 26, 2007 from web
- #Waondeggafire Parts of Del Dios Mountain open for recovery: All areas N of I-8, S of I-8, S of Grade Rd & Tamarack Rd. 03:55 PM October 26, 2007 from web

Reporting: Local incidents

Watch Jefferson County

Showing 1-50 of 4015. (3789 incidents, 232 reports)
Response: Gov’t, NGOs, victims

Sahana is a Free and Open Source Disaster Management system. It is a web based collaboration tool that addresses the common coordination problems during a disaster from finding missing people, managing aid, managing volunteers, tracking camps, effectively between Government groups, the civil society (NGOs) and the victims themselves.

SAHANA 0.6.2 stable released:

During the festive season, the Sahana community is proud to announce the release of Sahana 0.6.2 stable. Sahana is a disaster management system initiated after the devastating Asian Tsunami in 2004 and built around the concepts of metadata driven and component based development. This stable release is another major and memorable achievement by the Sahana community marking the three year anniversary of Asian Tsunami.

New features include:
- A much enhanced security framework with added capabilities, dynamic language translation, web services, RSS facility, mapping, together with a stable AJAX enabled interface.
- The release incorporates numerous bug fixes.

Recovery: Connected Giving

KatrinaHelp | Mirror

Citizen Action Team

Delivering help, real-time and on target.

- Katrina Help: We are an unaffiliated group of volunteers who have come together to provide supplies to the areas of the hurricane damaged coastline. We are serving the local rural areas affected by the hurricane. We are working directly with the sheltered relief teams in areas such as Biloxi, Biloxi Beach, Gautier and Pascagoula. We are working with warehouse operations in Biloxi and Gautier.

We need

- Volunteers
- Help with sorting, packing and distributing

Katrinahelp.info

Citizenactionteam.org

(Torrey et al., HICSS2008)
Recovery: Connected Giving

Katrina’s Angels exists to support communities affected by disasters by offering solutions to unmet needs and enhancing the recovery process through resource pooling and information sharing. 

Objectives:

Katrina’s Angels will:

- Provide structure and coordination of efforts to those on the ground following first response team efforts.
- Provide communication tools through its web site, KatrinaAngels.org and the Angels in Action Forum,
- Where Katrina’s Angels maintains a publicly available, state sorted, resource library.
- Partner with service and resource organizations to foster cooperation and resource coordination,
- We will always strive to reduce duplication of effort, and to enhance efficiency through resource management and feedback.
- Maintain high ethical practices and procedures for its volunteers and partner organisations.

http://www.katrinaangels.org

Recovery: I’m OK

Providing Safe and Well Information

Welcome to the American Red Cross Safe and Well Website. If you have been affected by a disaster, this website provides a way for you to provide your own “safe and well” information. From a list of standard messages, you can select those that most closely match your situation for your family members to see from where you are located.

Connected friends and family can search the list of those who have registered themselves as “safe and well.” The results of a successful search will display a list of names, locations, or their city, state and zip code(s) searched.

Many organizations are working with the American Red Cross to provide families in a variety of areas with the ability to communicate with family members during times of emergency. In addition to using this website, users can be notified of new messages and updates via text, email or phone.
Recovery: Memorials

Community response to emergencies
• 2007 CA wildfire
• Virginia Tech tragedy

Wikipedia "has emerged as the clearinghouse for detailed information on the event."

University of Maryland emergency response systems
• Typical Incident Command System
• UMD Alerts notification system

How to motivate participation?

Disaster-related
• Reporting
• Response
• Recovery

Is there a theory to start from?
Motivations of residents

• Fear, imminent threat  
  (Rogers, 1975)
• Revenge, response to tragedy, guilt  
  (Hanson, 2008)
• Theory of public-service motivation  
  (Perry, 2000)
• Egoism, altruism, collectivism, principlism  
  (Batson, Ahmad & Tseng, 2002)

Stages of participation

Wikipedia & Reporting sites
• Reader
• First-time Contributor  
  (Legitimate Peripheral Participation)
• Returning Contributor
• Frequent Contributor

Preece, Nonnecke & Andrews, CHI2004
Forte & Bruckman, SIGGROUP2005; Hanson, 2008
Vassileva, 2002, 2005; Ling et al., JCMC 2005; Rashid et al., CHI2006
From Reader to Leader: Motivating Technology-Mediated Social Participation

Preece & Shneiderman, AIS Trans. Human-Computer Interaction1 (1), July 2009
aisel.aisnet.org/thci/vol1/iss1/5/
Design for Activities

• Awareness ◊ Reader

• User-generated content ◊ Contributor
  • Make impact visible & recognition

• Email discussions ◊ Collaborator
  • Ambitious projects & reputation

• Policy & mentoring ◊ Leader

Motivating Readers

<table>
<thead>
<tr>
<th>Usability</th>
<th>Sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interesting &amp; relevant content presented in attractive, well-organized layouts</td>
<td>Encouragement by friends, family, respected authorities, advertising</td>
</tr>
<tr>
<td>Frequently updated content with highlighting to encourage return visits</td>
<td>Repeated visibility in online, print, television, other media</td>
</tr>
<tr>
<td>Support for newcomers: tutorials, animated demos, FAQs, help, mentors, contacts</td>
<td>Understandable norms &amp; policies</td>
</tr>
<tr>
<td>Clear navigation paths ◊ sense of mastery and control</td>
<td>Sense of belonging: recognition of familiar people &amp; activities</td>
</tr>
<tr>
<td>Universal usability: novice/expert, small/large display, slow/fast network, multilingual, support for users with disabilities</td>
<td>Charismatic leaders with visionary goals</td>
</tr>
<tr>
<td>Interface design features to support reading, browsing, searching, sharing</td>
<td>Safety &amp; privacy</td>
</tr>
</tbody>
</table>
## Motivating Contributors

<table>
<thead>
<tr>
<th><strong>Usability</strong></th>
<th><strong>Sociability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low threshold interfaces to encourage small contributions (no login)</td>
<td>Support for legitimate peripheral participation</td>
</tr>
<tr>
<td>High ceiling interfaces that allow large frequent contributions</td>
<td>Chance to build reputation over time while performing satisfying tasks</td>
</tr>
<tr>
<td>Visibility for users’ contributions &amp; impact - aggregated over time</td>
<td>Recognition for the highest quality &amp; quantity of contributions</td>
</tr>
<tr>
<td>Visibility of ratings &amp; comments</td>
<td>Recognition of a person’s specific expertise</td>
</tr>
<tr>
<td>Tools to undo vandalism, limit malicious users, control pornography &amp; libel</td>
<td>Policies &amp; norms for contributions</td>
</tr>
</tbody>
</table>

## Motivating Collaborators

<table>
<thead>
<tr>
<th><strong>Usability</strong></th>
<th><strong>Sociability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ways to locate relevant &amp; competent individuals to form collaborations</td>
<td>Atmosphere of empathy &amp; trust that promotes belonging to the community &amp; willingness to work within groups to produce something larger</td>
</tr>
<tr>
<td>Tools to collaborate: communicate within groups, schedule projects, assign tasks, share work products, request assistance</td>
<td>Altruism: a desire to support the community, desire to give back, willingness to reciprocate</td>
</tr>
<tr>
<td>Visible recognition collaborators, e.g. authorship, citations, links, acknowledgements</td>
<td>Ways to develop a reputation for themselves &amp; their collaborators; develop &amp; maintain status within group</td>
</tr>
<tr>
<td>Ways to resolve differences (e.g. voting), mediate disputes &amp; deal with unhelpful collaborators</td>
<td>Respect for status within the community</td>
</tr>
</tbody>
</table>
Motivating Leaders

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Leaders are given higher visibility &amp; their efforts are highlighted, sometimes with historical narratives, special tributes, or rewards</td>
<td>Leadership is valued and given an honored position &amp; expected to meet expectations</td>
</tr>
<tr>
<td>Leaders are given special powers, e.g. to promote agendas, expend resources, or limit malicious users</td>
<td>Respect is offered for helping others &amp; dealing with problems</td>
</tr>
<tr>
<td>Mentorship efforts are visibly celebrated, e.g. with comments from mentees</td>
<td>Mentors are cultivated &amp; encouraged</td>
</tr>
</tbody>
</table>

From Reader to Leader: Motivating Technology-Mediated Social Participation

Preece & Shneiderman, AIS Trans. Human-Computer Interaction1 (1), July 2009
aisel.aisnet.org/thci/vol1/iss1/5/
Strategies for managers

Charismatic leader & bottom-up initiatives
• Personal contact, viral marketing, 1-to-1
• Appeal to special skills & uniqueness
• Engage existing groups
• Seed activities to get started

Challenges to success

• Ensuring privacy protection
• Coping with misleading rumors
• Limiting malicious attacks
• Providing high reliability
• Delivering Universal Usability
• Resolving conflict within the community
National Initiative for Social Participation

• Goals:
  • Generate broad public support
  • Engage with policy makers
  • Dramatically increase funding
  • Expand courses & training
  • Launch ambitious pilot projects
  • Work with industry to promote research

State-of-the-art network visualization
Node Placement Methods

- Node-link diagrams
  - Force-directed layout
  - Geographical map
  - Circular layout
  - Temporal layout
  - Clustering
  - Layouts based on node attributes
- Matrix-based
- Tabular textual

1) NVSS: Semantic Substrates

- Group nodes into regions
  According to an attribute
    Categorical, ordinal, or binned numerical

- In each region:
  Place nodes according to other attribute(s)

- Give users control of link visibility

(Shneiderman & Aris, InfoVis 2006; Aris & Shneiderman, & InfoVis J 2007)
www.cs.umd.edu/hcil/nvss
Network Visualization by Semantic Substrates

NVSS 1.0
Filtering links by source-target

Filtering links by time attribute (1)
Network Visualization by Semantic Substrates

- Meaningful layout of nodes
- User controlled visibility of links
- Cross refs in 11 Circuit Courts (green) + few refs to District Court cases

www.cs.umd.edu/hcil/nvss

Network Visualization by Semantic Substrates

NVSS 2.0
with Substrate Designer
NVSS: Citation Historiographs

- Help in formulating queries
- Offer finding aids and introductions to fill in missing knowledge
- Provide overviews to show context for search results
  - geo-maps
  - timelines
  - concept maps
  - thesauri, taxonomies, directories

SocialAction

- Focused on integrating statistics & visualization
- 4 case studies, 4-8 weeks (journalist, bibliometrician, terrorist analyst, organizational analyst)
- Identified desired features, gave strong positive feedback about benefits of integration

Perer & Shneiderman, CHI 2008
NodeXL:
Network Overview for Discovery & Exploration in Excel

www.codeplex.com/nodexl
Interdisciplinary Challenges

• Modern problems are complex
• Solutions require multiple disciplines
• Laboratory studies have limited relevance
• Natural sciences are not sufficient

UN Millennium Development Goals

• Eradicate extreme poverty and hunger
• Achieve universal primary education
• Promote gender equality and empower women
• Reduce child mortality
• Improve maternal health
• Combat HIV/AIDS, malaria and other diseases
• Ensure environmental sustainability
• Develop a global partnership for development

To be achieved by 2015
Short Range Goals

• Validate benefits of new designs

• Move from observational & experimental to interventional

• Rapid refinements of designs
• Benefits to users

Long Range Goals

• Harness Collaboration
  • Pair-wise
  • Small Team
  • Larger Group
  • Social Creativity
Long Range Goals

• Harness Collaboration
  • Pair-wise
  • Small Team
  • Larger Group
  • Social Creativity

  Measure giga-collabs and peta-contribs

Long Range Goals

• Understand dynamics of
  • Trust
  • Empathy
  • Responsibility
  • Privacy
  • Etc.
Road ahead

• Much work to be done
• Difficult to attain all our goals
• But we can make important contributions

• Shift public policy
  • National Institutes for Collaboration
  • National Initiative for Social Participation
Road ahead

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Let’s roll!
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